26. Incorporating environmental variability in matrix models predictions for highly diverse rainforests

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In matrix models that describe forest dynamics, the uncertainty on model predictions is directly related to the precision of estimation of the transition parameters of the model (growth, recruitment and mortality rates). The two main sources of variability in parameter estimates are sampling and environmental variability. Sampling variability depends on the amount of available observations. As tropical rainforests have many rare species, most species-specific parameter estimates have huge errors. A solution to this problem is to group species into functional group to increase the number of available observations. Environmental variability is related to the spatio-temporal variations of transition parameters due to environmental fluctuations. This kind of variability is not yet considered in the models used by forest managers. We address rainfall variability in forest dynamic predictions. Species were grouped according to their response to drought. The functional species classification and the relation between transition parameters and climatic covariates for each species group has been simultaneously fitted using cluster-wise regression. Data come from permanent sample plots (25 years monitoring) located in the Central African Republic. We predict stand dynamics and we compare and discuss predictions with and without rainfall variability.

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